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(56) Documents Cited

GB 1253623 A GB 1219041 A EP 0288964 A
WO 91/14746 A US 4654236 A US 4597998 A
US 4404042 A US 4208465 A US 3317318 A
WPI Abstract Accession No 96-334914[34] & DE
19608387 A1

(58) Field of Search

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(54) Abstract Title

Coating metallic articles

(57) A process for coating a metallic article comprises the addition of a coloured lacquer to the metallic material. The coloured lacquer, which may comprise a clear base polyester lacquer and one or more pigments, when applied to the metallic material (conveniently stainless steel in strip form) and stoved, imparts to the material a high quality finish, having the appearance of brass.

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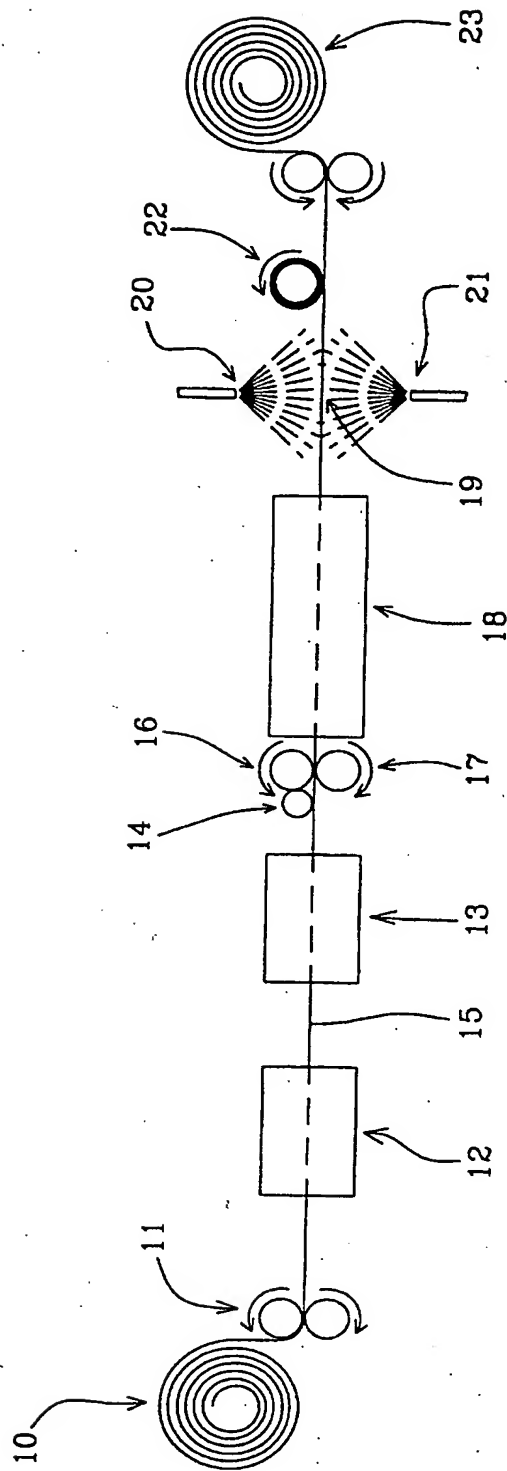


FIG 1

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PATENTS ACT 1977

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Title: Process for Coating Metallic Articles

Description of the Invention

This invention relates to a process for coating metallic articles and particularly but not exclusively to a process for coating stainless steels, in which context the invention will hereinafter be described.

Stainless steels are widely used in a variety of industrial and domestic applications, in view of their resistance to corrosion and staining. In many of such applications, however, the surface appearance imparted by the stainless steel is unsatisfactory, and it is common practice to provide on the stainless steel a layer of other metal. It is, for example, frequently desired that the surface appearance of an article adopt the appearance of a different metal, such as, for example, a more expensive metal such as gold, silver or brass.

In order to achieve this, the stainless steel is electroplated with a salt solution of the metal concerned, which may be gold, or brass, thus applying a layer of the metal to the surface of the stainless steel, a layer of lacquer then being applied to the electroplated steel and the resulting material then being stoved in order to harden the lacquer onto the metallic layer in conventional manner.

However, such processes suffer from the obvious disadvantages of expense in that the metal salt solutions concerned are expensive, particularly in the case of gold and other precious metals, and that the coating process is time consuming.

It is thus a primary object of the present invention to provide an improved coating process which at least reduces the problems set out above.

According to a first aspect of the present invention, there is provided a process for coating metallic articles comprising the addition of a coloured lacquer to the metallic material.

It will be appreciated that the term "metallic" as used herein includes alloys, inter-metallic compounds, and the like.

The metallic material preferably exhibits a relatively high degree of reflectance. Alternatively, the metallic material may be treated, such as by polishing, or by chemical means, so as to provide it with a relatively high degree of reflectance.

In this way, it has been found that an article of stainless steel may be given the appearance of being made of brass (for example), simply and economically.

Conveniently, the coloured lacquer is a polyester lacquer and preferably, the metallic material concerned is stainless steel.

Preferably, the lacquer comprises a clear base lacquer to which one or more pigments have been added, as desired, such that the coloured effect imparted to the metallic material may be varied in accordance with the type of metal whose appearance it is desired to give.

Preferably, the lacquer is applied, conveniently by means of a roller, when the material is in strip form such as is the case subsequent to a rolling operation. The lacquer is then preferably hardened by stoving the material, conveniently at around 280°C, and, once cooled and dried, a low tack adhesive film may be applied to the material for protective purposes, also conveniently by means of a roller. The strip may then be coiled, for storage and transportation purposes.

When it is desired to form the coloured material, this may be achieved by further rolling, or pressing, in conventional manner, and it has been found that the coating is not damaged by such forming operations, such that the colour imparted to the material remains generally intact, thus giving a high quality appearance.

It will be appreciated that the metallic material utilised may vary in accordance with requirements, but it has been found by the applicants that a particularly effective appearance may be obtained by using stainless steel in conjunction with a polyester lacquer to which appropriate amounts of yellow/gold pigments have been added, the result being that a high quality brass effect is obtained.

Specifically, the stainless steel substrate may be that known as 430BA S17 grade, which has a high degree of reflectance.

By use of the present invention, a high quality coloured metallic material may be provided, at a significantly reduced cost in relation to previously utilised methods, which cost reduction arises not only from the reduced cost of the materials used, but also in that significant power savings are achieved since no electroplating is required.

Furthermore, the process by which the coating is imparted to the metallic material is considerably simpler than those previously utilised, such that the cost in terms of labour is considerably less than that associated with previously utilised methods.

It will be appreciated that the precise composition of the polyester lacquer concerned is not essential to the working of the present invention, and furthermore, that numerous different pigments may be used as required.

However, the applicants have found that a particularly satisfactory brass effect is obtained when the process is conducted in the following manner, and with the following materials.

Preferably, the base lacquer comprises, by volume, 70-80% polyester resin identical or similar to that which is available under the trade mark URALAC SN808. The base lacquer may also comprise melamine resins such as those which are available under the trade marks BEETLE BE3745 and BEETLE 3717, a halogen-free cationic compound such as that which is available under the trade mark EFKA 777, a hydrocarbon solvent such as that which is available under the trade mark HAMSOL 150, and Butyl Diglycol.

In a preferred embodiment of the invention, the base lacquer comprises, by volume, 76.4% URALAC SN808 (trade mark), 4.6% BEETLE BE3745 (trade mark), 2.4% BEETLE 3717 (trade mark), 0.7% EFKA 777 (trade mark), 9.5% HAMSOL 150 (trade mark), and 6.4% Butyl Diglycol.

This produces a clear lacquer, which once hardened, provides a high quality, scratch proof coating on the metallic article to which it has been applied.

As regards the pigment, a particularly suitable range has been found to

be that commercially available under the trade mark SAVINYL DYESTUFFS.

As mentioned above, the precise quantities may be varied in accordance with particular requirements, but in order to achieve a high quality brass effect, it has been found that the following quantities are particularly suitable:

SAVINYL Yellow 2GLS (204 Grams)

SAVINYL Yellow 2RLS (245 Grams)

SAVINYL Scarlet RLS (612 Grams)

These dyestuffs, in powder form, are thoroughly mixed, in conventional manner, and are then added, in a 1:10 ratio by weight, to clear HAMSOL 150 polyester lacquer, to produce a stain "pre-mix" which is then added to the main bulk of the clear lacquer as above described, to produce the desired coloured, but transparent, lacquer.

Further HAMSOL 150 polyester lacquer may be then added to adjust the viscosity of the now coloured lacquer as required.

By preparing such a "pre-mix" which is then added to the main bulk of the clear lacquer, uniform distribution of the pigment in the lacquer may be obtained, so that when the coloured lacquer is applied to the metallic substrate, a high quality, and uniformly dispersed, coloration is imparted to the substrate. This is in contrast to the situation which arises when all of the pigment and bulk lacquer is mixed in one step, which results in patchy mixing and insufficient bonding of the coloured lacquer to the metallic substrate.

The invention will now be described in greater detail, but by way of example only, by reference to the accompanying drawing, which is a schematic illustration of the various stages which the method entails.

Referring to the drawing, a steel strip coating line is shown, which typically has a length of 500-600 ft (about 150-180 m), and which is capable of supporting about 1 tonne of material at any one time.

The line includes a coil 10 of stainless steel strip, mounted for rotation about a generally horizontal axis, and from which the strip may be withdrawn by a pair of counter-rotating feed rollers 11. The stainless steel strip is passed through various washes and pre-treatment stations 12 and 13, and then dried.

A coloured lacquer is then applied to the moving strip by a roller 14. It will of course be appreciated that lacquer could also be applied to the underside of the strip 15 if desired, and that the lacquer could be applied other than by means of a roller, such as, for example, by spraying.

The coated strip 15 is then pulled, by further feed rollers 16 and 17, to a stoving tunnel 18 comprising an array of heating elements, in which the lacquer is hardened.

On exiting the stoving tunnel 18, the heated strip is cooled at a region indicated generally by figure 19, by a pair of water jets 20 and 21, and then dried.

A film of low tack adhesive is then applied to the surface of the strip 15 from a roll 22, and the coloured lacquer, now protected by a layer of low tack adhesive, is then recoiled at the region generally indicated by reference numeral 23, for storage and subsequent transportation.

It will, of course, be appreciated that the relative distances between the various stages shown in the drawing are not necessarily to scale, but that the drawing serves merely to illustrate the various steps which need be taken to put a preferred form of the invention into practice.

Whilst the invention has been described herein in relation to stainless steel, it will be appreciated that it may be utilised with other metallic materials where similar or analogous problems arise.

According to a second aspect of the invention, there is provided an article having the appearance of brass, comprising stainless steel having been coated with a coloured lacquer.

The coloured lacquer is preferably as hereinbefore described.

The features disclosed in the foregoing description for the following claims, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS

1. A process for coating a metallic article comprising the addition of a coloured lacquer to the metallic material.
2. A process according to claim 1 wherein the lacquer is a polyester lacquer.
3. A process according to claim 1 or claim 2 wherein the lacquer comprises a base component and a pigment, the base component comprising, by volume, about 70-80% polyester resin identical or similar to that which is available under the trade mark URALAC SN808.
4. A process according to claim 3 wherein the base component further comprises hydrocarbon solvent identical or similar to that which is available under the trade mark HAMSOL 150.
5. A process according to claim 3 or claim 4 wherein the base component further comprises Butyl Diglycol.
6. A process according to any one of claims 3 to 5 wherein the base component comprises, by volume, about 76.4% polyester resin identical or similar to that which is available under the trade mark URALAC SN808, about 4.6% melamine resin identical or similar to that which is available under the trade mark BEETLE BE3745, about 2.4% melamine resin identical or similar to that which is available under the trade mark BEETLE 3717, about 0.7% halogen-free cationic compound identical or similar to that which is available under the trade mark EFKA 777, about 9.5% hydrocarbon solvent identical or similar to that which is available under the trade mark HAMSOL 150, and about 6.4% Butyl Diglycol.

7. A process according to any one of claims 3 to 6 wherein the pigment is identical or similar to that which is commercially available under the trade mark SAVINYL DYESTUFFS.
8. A process according to claim 7 wherein the pigment comprises pigment which is identical or similar to that which is commercially available under the trade mark SAVINYL Scarlet RLS, pigment which is identical or similar to that which is commercially available under the trade mark SAVINYL Yellow 2RLS, and pigment which is identical or similar to that which is commercially available under the trade mark SAVINYL Yellow 2GLS in a ratio, by weight, of approximately 1:0.4:0.3.
9. A process according to claim 7 or claim 8 wherein the pigments, in powder form, are added, in about a 1:10 ratio, by weight, to clear solvent which is identical or similar to that which is commercially available under the trade mark HAMSOL 150, to produce a pre-mix.
10. A process according to claim 9 wherein the pre-mix is then added to the remainder of the base components of the lacquer.
11. A process according to any one of the preceding claims wherein the lacquer is applied to the material when the material is in strip form.
12. A process according to claim 11 wherein the lacquer is applied to the strip by a roller.
13. A process according to any one of the preceding claims wherein the metallic material is stainless steel.
14. A process according to any one of the preceding claims wherein the metallic material exhibits a relatively high degree of reflectance.

15. A process according to claim 13 or claim 14 wherein the stainless steel is identical or similar to that which is known as 430BA S17 grade.

16. A stainless steel article having the appearance of brass, the stainless steel having been coated with a coloured lacquer.

17. An article according to claim 16 wherein the coloured lacquer is as defined in any one of claims 2 to 9.

18. Any novel feature or novel combination of features hereinbefore described.



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Application No: GB 9814692.1
Claims searched: 1-17

Examiner: Richard Kennell
Date of search: 23 September 1998

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): B2E (EKB)

Int Cl (Ed.6): B05D 7/16

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X,Y	GB 1253623 A	(IMPERIAL CHEMICAL INDUSTRIES), whole document	1,2(X); 16(Y)
X,Y	GB 1219041 A	(J R GEIGY), see Example 20	1,2(X); 16(Y)
X,Y	EP 0288964 A	(BASF LACKE), whole document	1,2,11(X); 12(Y)
X,Y	WO 91/14746 A	(ALCAN INTL.), whole document, esp. Example 2	1,2,11(X); 12(Y)
X,Y	US 4654236 A	(FINZEL), whole document, esp. col 3 line 48 - col 4 line 10	1,2,11,13 (X); 12,16(Y)
X	US 4597998 A	(MOSTAFA), whole document	1,2
X,Y	US 4404042 A	(OKADA), whole document	1,2(X); 12,16(Y)
X	US 4208465 A	(CHANG), whole document, see polyesters at col 7 lines 6-8	1,2
X,Y	US 3317318 A	(BACKUS), whole document	1,13(X); 16(Y)

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

& Member of the same patent family

A Document indicating technological background and/or state of the art.
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.



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Category	Identity of document and relevant passage	Relevant to claims
X, Y	WPI Abstract Accession No 96-334914[34] & DE 19608387 A1 (GLOWIK), see abstract	1(X); 16 (Y)

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.